

Remarks

Claims 1, 4-6, 13-16 & 18-26 are pending. Claims 19-26 are withdrawn from consideration. Claims 1, 4-6, 13-15, 16 & 18 are rejected. Claim 14 is objected to.

Review and reconsideration are requested.

Election/Restriction

The Examiner imposed a restriction requirement to one of the following inventions:

- I - Claims 1, 4-6, 13-16 & 18 drawn to a heat exchanger (product made); and
- II - Claims 20-26 drawn to an apparatus for manufacturing a fin.

The Examiner observed that “Inventions I and II are related as apparatus and product made.” And that “. . . the product as claimed can be made by another and materially different apparatus (MPEP § 806.05(g)). In this case, punching or pressing and expanding, e.g. expanded metal”. Applicant respectfully disagrees because the example suggested by the Examiner is not workable. The heat exchanger product as claimed includes multiple cores with first and second fins that are integrally formed together so that the second fin has a shape that complements that of the first fin. The claimed invention calls for “a plurality of thermal breaks, each comprising a slit with displaced opposing edges having a length exceeding one convolution that is cut without the removal of material by teeth in intermeshing forming rolls from the serpentine fins and louvers in one pass through the forming rolls.” A punching operation typically is accompanied by the removal of material and often produces a serrated edge but would be detrimental to thermodynamics of heat energy transfer. Pressing and expanding would fail to produce the thermal breaks as claimed.

Applicant respectfully suggests that the burden is on the Examiner to suggest another viable example or withdraw the restriction requirement.

Additionally, claim 1 has been amended so that it calls for a multiple core exchanger of thermal energy with “the second fin being integrally formed with the first fin using the tool of claim 20.” As now presented, claims 1 and 20 are linking claims such that it cannot be said that there are distinct inventions in Groups I and II.

Examination of the withdrawn claims 20-26 is therefore respectfully requested, together with a rescission of the restriction requirement.

Claim Objections

Claim 14 was objected to under 37 C.F.R. § 1.75(c). In response, claim 14 has been amended so that it now incorporates the limitations of claim 13. That claim has been amended to call for “louvers provided in a core selected from the group consisting of the first core, the second core, and a combination thereof, . . .”. The “louvers” limitation has been deleted from claim 1.

As amended, claim 14 now fully complies with 37 C.F.R. § 1.75(c).

Claim Rejections - 35 U.S.C. § 103

Claims 1, 4-6, 13 & 15-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Martins et al. in view of Sugimoto et al. (5,992,514) or Yamanaka et al. The Examiner is of the view that “Martins et al discloses all the claimed limitations except the thermal break having a length exceeding one convolution.” Applicant respectfully disagrees for the following reasons.

In the embodiment depicted in Figure 2(e) of the present case, there is shown a thermal break that is roll formed by fin separation. The slit 50 is formed between the first and second upper and lower folds and the first and second walls. Thus, viewed from the side, a slit 50 is shown with displaced opposing edges, thereby creating one form of the thermal

break. Specification, p. 8, ll. 7-8. When the edges of the slit are separated (see Figure 2(e)), the slit inhibits the flow of heat energy across its width. See also Figures 1(b), 1(c) & 1(d). The slit is depicted by the reference numeral 50.

One attribute of slits 50 being formed without the removal of material is that unwanted debris does not clutter the teeth of the forming rolls during the manufacturing operation. Manufacturing economics are thereby improved by avoidance of an unnecessary manufacturing step, while prolonging tool life.

Since the premise that “Martins et al. discloses all claimed limitations except the thermal break having a length exceeding one convolution” fails, a proposed combination with Sugimoto et al. or Yamanaka et al. would fail to teach or suggest the invention as now claimed.

The Examiner is of the view that the recitation of “by teeth in intermeshing forming rolls with the serpentine fins and louvers in one pass through the forming rolls” is considered to be a method limitation in an apparatus claim which bears no patentable weight in this instance. MPEP § 2113. Claim 1 has been amended for clarification.

In this situation, there are significant differences between the serpentine fins produced by the process recited in claim 1 as compared to the fins made by prior art approaches. The differences are described in the claims: The serpentine fins have “a slit with displaced opposing edges having a length exceeding one convolution that is cut without the removal of material by teeth in intermeshing forming rolls from the serpentine fins and louvers in one pass through the forming rolls.” Applicants therefore respectfully suggest that the invention as defined in claim 1 (and those claims which depend therefrom) fully comply with MPEP § 706.03(e). The claimed invention is new in structural terms (and therefore meets the novelty requirement) in that the serpentine fins have one or more slits with displaced opposing edges with a length that exceeds one convolution.

Additionally, certain apparent “process” words in claim have been interpreted as structural limitations when they adequately define a physical characteristic of the product. CHISUM ON PATENTS, §8.05[4] (courts have held a variety of words not to be process limitations; typical are: . . . 'pressfitted' as descriptive of a sheet metal structure, citing Saxe & Levitt, “Product-By-Process Claims And Their Current Status”, 42 JPOS 528, 536 (1960)).

However, there is an unobvious difference between the claimed product and the prior art. The difference is that the invention as claimed is formed in one pass without the removal of material, while simultaneously cutting, rolling, and forming. Thus, all of these operations occur simultaneous in one pass during the interface between an incoming flat strip during its transitory passage and re-shaping between intermeshing forming roll before serpentine fins emerge.

Claims 4-5 incorporate the limitations of claim 1 and are therefore patentable over Martins et al. for the reasons stated earlier.

Claim 18/16/1 incorporates the limitations of claim 1 and is patentable over the cited combination of references for the reasons stated. Motegi et al. '220 discloses elongated fins which are arranged in parallel with one another. There is no disclosure of a structure which would include multiple cores for the serpentine fin having slits with displaced opposing edges that are formed in without removal of material by teeth in intermeshing form rolls in one pass therethrough.

In contrast, Martins et al. (6,502,305) discloses a convolution (see, e.g. 65-66) from which material has been removed (e.g. Figure 6). The removal of material during roll forming causes unwanted debris to gather in and around the forming rolls. Additionally, the '305 patent suggests that the ridge line of a given convolution has an equal elevation on either side of the break 28. Such is not the case in the invention as now claimed (“displaced opposing edges”).

Applicant respectfully observes that the "thermal fuse" limitation of claim 1 (depicted as reference numeral 28 in the '305 patent) has been deleted. For all these reasons, it cannot be said that the invention as now claimed has substantially all of its limitations disclosed in Martins et al.

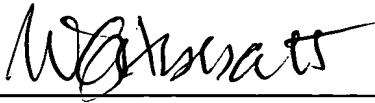
Examination of all pending claims (including those previously withdrawn) is courteously solicited. All formal and substantive requirements of patentability now appear to be met. If a telephone conference would expedite prosecution, the Examiner is asked to contact the undersigned.

A check in the amount of \$55 is enclosed to cover the Petition fee. Please charge any additional fees or credit any overpayments as a result of the filing of this paper to our Deposit Account No. 02-3978 -- a duplicate of this paper is enclosed for that purpose.

Respectfully submitted,

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